# TLS

AT100

Wireless temperature sensor for indoor use

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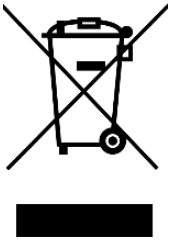

**Recycling**

The packaging is recyclable. The product, except for the battery follows the WEEE directive for recycling. When disposing of your product, follow the local regulations on recycling. The product and/or the battery must never be thrown away or subjected to fire, but taken care of in accordance with your local regulations regarding chemical waste.

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# Introduction

AM100 is a wireless sensor for air temperature for indoor use. The sensor reads and transmits regularly the temperature to a wireless MBUS master that stores the readings. The unit also contains an electronic seal which indicates if someone has been manipulating the unit.

# Order and purchase

To facilitate the installation, we recommend that you order the units with or without encryption activated to avoid configuration at the point of installation. The configuration can be changed using an installation tool when needed, see Installation tools.

| Order code: | Encryption: |
|---|---|
| AT100-E | YES |
| AT100-NE | No |

# Installation

The unit can be mounted using either double-sided adhesive tape or a screw.

The double-sided tape is recommended on surfaces such as:

- Painted walls and ceilings
- Painted woodwork
- Wallpaper without structure

The double-sided tape is not recommended for surfaces such as:

- Roughly structured surfaces
- Structured wallpaper

The unit is activated when it is first opened.

To verify that the unit is functioning correctly the LED will light up with a red light showing for ten seconds, every time the unit is opened.

## Location

For correct recording, the AM100 should be placed on a spot with constant temperature, avoid the kitchen, outside the bathroom and areas exposed to sunshine. The unit should be placed on an inner wall, 1 metre horizontally from the nearest radiator and at a height of at least 150 cm.

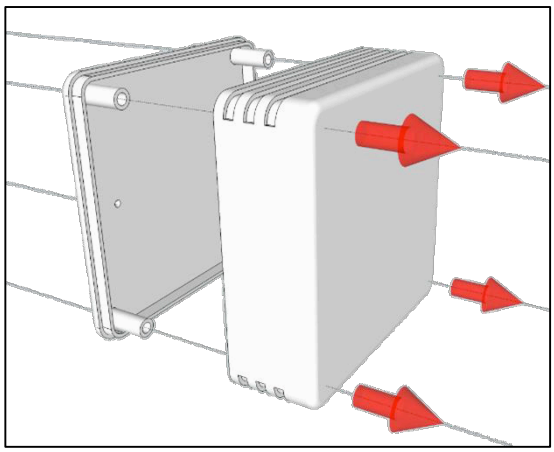

*Figure 1 taking apart the unit*

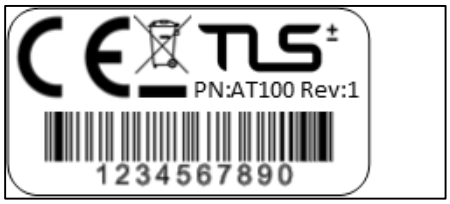


*Figure 2 Identification and serial number of the unit*

## Mounting with adhesive double-sided tape

**Note!**

**The back of the unit is coated with very strong adhesive tape and removal of the unit will cause damage to the wall's surface. Please note that the unit can be switched without causing damage.** The product has industrial strength adhesive tape attached to the back.

To mount the unit:

1. Determine the location of the unit.
2. Clean the surface with the enclosed cloth.
3. Remove the protective film and press the unit against the wall, keep pressing for 10 seconds.
4. Remove the lid and check that the LED shows a steady red light for 10 seconds. (see Fig1). Should the tape come off the wall, screw the unit in place, see ”Mounting with screw”.
5. Note down the serial number of the unit and press back the unit into the holder, paying attention to the ‘ up’ marking on the circuit board.

## Mounting with screw

For mounting of the unit on surfaces not suitable to adhesive tape, a screw can be used.

1. Determine the location of the unit and centre drill a hole using the template.
2. Carefully remove the lid, pulling straight out. The LED shall light up for 10 seconds. (see Figure 1).
3. On the bottom of the unit are weaker points where screw can be used.
4. Note down the serial number of the unit and press back the unit into the holder, paying attention to the ‘up’ marking on the circuit board.

## Encryption codes and password

For reasons of security, all the encrypted AT100 are delivered with different encryption codes. The codes are delivered digitally in a .CSV file for import to reading system.

# Installation tools

The unit's settings can be changed using a mobile app. The settings are changed wirelessly by touching the unit. An installation password is required, available to certified installation electricians.

Using the configuration tool, the following parameters can be changed.

- Encryption (on/off)
- Encryption key
- Transmission period
- Web address for NFC reading

The tool can also reset the unit and perform a self-test.

# Usage

Mobile phones with NFC (Near Field Communication) can be used to gain information about the current temperature by tagging or touching the unit with the back of the mobile phone.

## Mobile phones with Android x.xx or later

1. Activate NFC through the phone's settings
2. Drag the back of the mobile phone slowly towards the unit, as the antennas align, a link will open showing the temperature reading.

# Communication

The unit transmits regularly wireless messages with current temperature in a settable interval; the messages in conformity with the Wireless M-Bus standard EN 13757-4 in T1 Mode.

At the point of delivery, the unit transmits messages every 6 minutes as well as asynchronous messages when the lid of the unit is opened (electronic seal).

Each message includes:

- Average temperature since the previous message
- 1 hour continuous Average/Max/Min
- 24 hours continuous Average/Max/Min
- The unit's serial number
- MBUS Unique identification number
- Battery status
- Electronic seal

## Message formats

The messages below are described in plaintext, fields marked in green will be encrypted if encryption is activated. For detailed information refer to EN 13757-4.

| Byte: | Value(default) | Description: |
|---|---|---|
| 0 | 0xnn | L-field |
| 1 | 0x44 | C-field |
| 2-3 | 0x5193 | Manufacturer ”TLS” |
| 4-7 | 0xnnnnnnnn | MBUS Identification number |
| 8 | 0x01 | Protocol version |
| 9 | 0x1B | Product type. Room sensor |
| 10-11 | 0xnnnn | CRC |
| 12 | 0x7A | CI-field |
| 13 | 0xnn | Access number (increased by each regular transmission) |
| 14 | 0x00 = Normal<br>0x04 = Low battery level<br>0x03 = Seal open | Status |
| 15-16 | 0x0000 = Not encrypted<br>0x???? = Encrypted | Encryption settings |
| 17-18 | 0x2f2f | Idle filler(encryption verification) |
| 19 | 0x02 | DIF: Current temperature |
| 20 | 0x65 | VIF: signed 16bit, 2decimals |
| 21-22 | 0xnnnn | Current temperature with 2decimals, in error showing 0. Ex. 2310 = 23,10*C |
| 23 | 0x42 / 0x72 | DIF: 1 hour continuous average value, store value 1.<br><br>0x42 = Reliable<br>0x72 = Non-reliable |
| 24 | 0x65 | VIF: signed 16bit, 2decimals |
| 25-26 | 0xnnnn | 1 hour continuous average temperature, 2 decimals, in error showing 0.<br>Ex. 2310 = 23,10*C |
| 27 | 0x82 / 0xb2 | DIF: 24 hours continuous average value, store value 1.<br><br>0x82 = Reliable<br>0xb2 = Non-reliable |
| 28 | 0x01 | DIFE |

| | | |
|---|---|---|
| 29 | 0x65 | VIF: signed 16bit, 2decimals |
| 30-31 | 0xnnnn | 24 hours continuous average temperature, 2 decimals, in error showing 0.<br>Ex. 2310 = 23,10*C |
| 32 | 0x22 | DIF: 1 hour continuous Min |
| 33 | 0x65 | VIF: signed 16bit, 2decimals |
| 34-35 | 0xnnnn | 1 hour continuous Min-temperature, 2decimals, in error showing 0.<br>Ex. 2310 = 23,10*C |
| 36 | 0x12 | DIF: 1 hour continuous Max |
| 37 | 0x65 | VIF: signed 16bit, 2decimals |
| 38-39 | 0xnnnn | 1 hour continuous Max-temperature, 2decimals, in error showing 0.<br>Ex. 2310 = 23,10*C |
| 40 | 0x52 | DIF: 24 hours continuous Min, store number 1 |
| 41 | 0x65 | VIF: signed 16bit, 2decimals |
| 42-43 | 0xnnnn | 24 hours continuous Min-temperature, 2 decimals, in error showing 0.<br>Ex. 2310 = 23,10*C |
| 44 | 0x62 | DIF: 24 hours continuous Max, store number 1 |
| 45 | 0x65 | VIF: signed 16bit, 2decimals |
| 46-47 | 0xnnnn | 24 hour continuous Max-temperature, 2decimals, in error showing 0.<br>Ex. 2310 = 23,10*C |
| 48 | 0x01 | DIF |
| 49 | 0x7F | VIF: 8bit signed integer |
| 50 | 0xnn | Number of seal breakings, accumulates at each opening. |
| 51 | 0x42 | DIF |
| 52 | 0x7F | VIF: 16bit signed integer |
| 53-54 | 0xnnnn | Manufacturer specific |
| 55 | 0x84 | DIF |
| 56 | 0x01 | DIFE |
| 57 | 0x7F | VIF, 32 signed integer |
| 58-61 | 0xnnnnnnnn | Hardware serial number |
| 62 | 0xC2 | DIF |
| 63 | 0x01 | DIFE |

| | | |
|---|---|---|
| 64 | 0x7F | VIF, 16 signed integer |
| 65-66 | 0xnnnn | Manufacturer specific |
| 67 | 0x84 | DIF |
| 68 | 0x02 | DIFE |
| 56 | 0x7F | VIF, 16 signed integer |
| 57-60 | 0xnnnn | Manufacturer specific |

## Technical specifications

| | |
|---|---|
| Manufacturer | TLS Energimätning AB |
| Product name | AT100 |
| Material | ABS UL94-HB |
| Protection | IP20 |
| Measurements | 71x71x27mm |
| Weight | 50g |
| Battery type | Lithium (non-rechargeable) |
| Battery service length | Up to 12 years |
| Operation temperature | 0 - 55°C |
| Storage temperature | -10 – 55°C |
| Temperature accuracy 18-24*C | ± 0,3°C |
| Temperature accuracy 0-55*C | ±0,5°C |
| M-Bus standard | EN 13757-4 (T1 Mode) |
| Transmission effect | 10mW |
| Frequency | 868,95MHz |

## Safety:

AM100 must only be installed by competent personnel and all safety instructions must be followed during installation and use. Documentation regarding the installation and use of the product shall be forwarded to parties involved.

The battery must not be recharged and may only be replaced by qualified service personnel approved by TLS Energimätning.
Installation or use may not start until the instructions are read.

The circuit board is sensitive to static electricity, hence during the installation the circuit board must not be touched without the use of ESD bracelets or similar.

The product markings may not be removed, amended or in any other way made unidentifiable.